



U.S. Army Research, Development and Engineering Command

# Sustainable Painting Operations for the Total Army: **SUCCESS!**



***TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.***

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# What I am not going to present today (but could)



- List of projects
  - Chemical Agent Resistant Coatings (CARC) and non-CARC paints
  - Sealants, adhesives and other coatings
  - Solvents, thinners, cleaners and paint removers
- Regulatory and performance status
  - Enabling compliance with hazardous air pollutant (HAP) standards, including those not yet issued
  - Minimizing other environmental impacts – volatile organic compounds (VOCs), metals, energy consumption
  - Not just meeting but blowing past minimum required levels of emissions and performance
  - Filling gaps left by products currently (un)available to Army users



# What I am not going to present today (but could)



## ■ Technical jargon

- CIE L\*, a\*, b\* color space designation
- GMW 14872 cyclic corrosion resistance
- ASTM F519 hydrogen embrittlement
- König pendulum hardness
- Etc.

## ■ Lots of numbers

- **10's** of new, modified or revised specifications
- **100's** of types/classes of products affected
- **1,000's** of new, modified or revised National Stock Numbers (NSNs)
- **10,000's** of pages of technical manuals, bulletins and drawings used for implementation
- **100,000's** of soldiers and civilians touched
- **1,000,000's** of gallons of surface coatings impacted (and pounds of HAPs reduced)





# What am I going to present today?



- Sustainability in action
- RDECOM as agent of change
- Success!



WINNER

2010 Secretary of the Army Environmental Award  
Environmental Excellence in Weapon System Acquisition, Small Program  
Sustainable Painting Operations for the Total Army

2010 Secretary of Defense Environmental Award  
Environmental Excellence in Weapon System Acquisition, Small Program  
Sustainable Painting Operations for the Total Army

2009 Army Research and Development Achievement Award  
Outstanding Technical Achievement  
Development and Application of Low Solar Absorbing Chemical Agent Resistant Coatings



RUNNER-UP

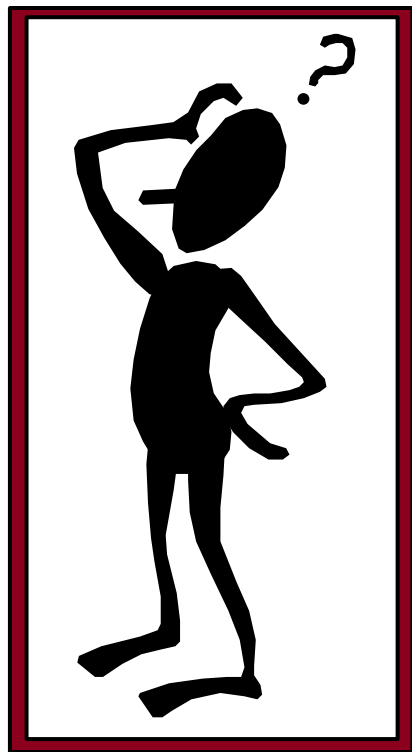
SAE Environmental Excellence in Transportation Award  
Reduction of Methylene Chloride-Based Paint Strippers at Anniston Army Depot

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# Changing the Way Coatings Are Made



## Army query to paint industry

- Q: All of our coatings use resins dissolved in HAP solvents. Do you have an alternative, HAP-free resin system suitable for Army paints?
- A: No.
- Q: Could you make one for us?
- A: Gee, no one has ever asked us that before...

As it turns out, “yes”

**“HAP-free” now starting point for new paints**

“Reformulating with oxygenated solvents can significantly reduce or **eliminate solvent-related HAPs** while maintaining virtually the **same performance characteristics.**”

- Paint & Coatings Industry Magazine (Sep '02)



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# Changing the Way Coatings Are Applied



Two primary air emission mechanisms from conventional spray application:

1. Solvent/volatile evaporation (organic)
2. Solid/particulate atomization (inorganic)



Alternative application methods eliminate one or both air emission mechanisms, offer other process improvements



## Touch-up kits

1. Solvent/volatile
- ~~2. Solid/particulate~~

## E-coat

1. Solvent/volatile
- ~~2. Solid/particulate~~



## Powder

- ~~1. Solvent/volatile~~
2. Solid/particulate

## UV-curable

- ~~1. Solvent/volatile~~
2. Solid/particulate





# Changing the Culture at Army Installations

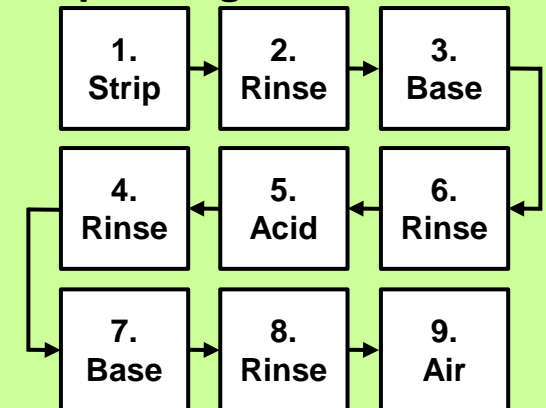


- Keep an open mind
- Work with, not against regulators
- Use “green” for your benefit

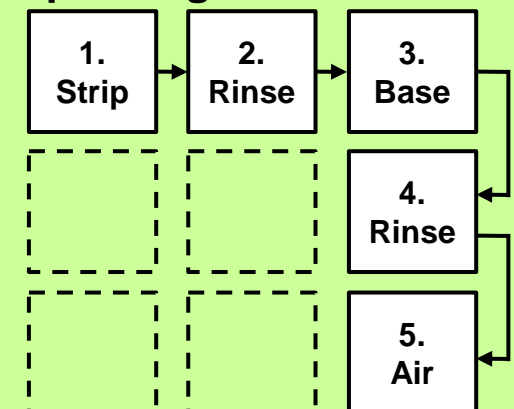
Anniston Army Depot (ANAD) has made a commitment to becoming more sustainable... will test and evaluate alternatives that meet mission requirements... will provide suitable location, manpower and parts to validate the performance of the alternative(s).

- ANAD General Manager, Production Operations

## Methylene Chloride Depainting Process Flow



## Alternative Depainting Process Flow







# Keeping Responsibility and Authority Together (Where They Belong)



You can delegate authority but not responsibility

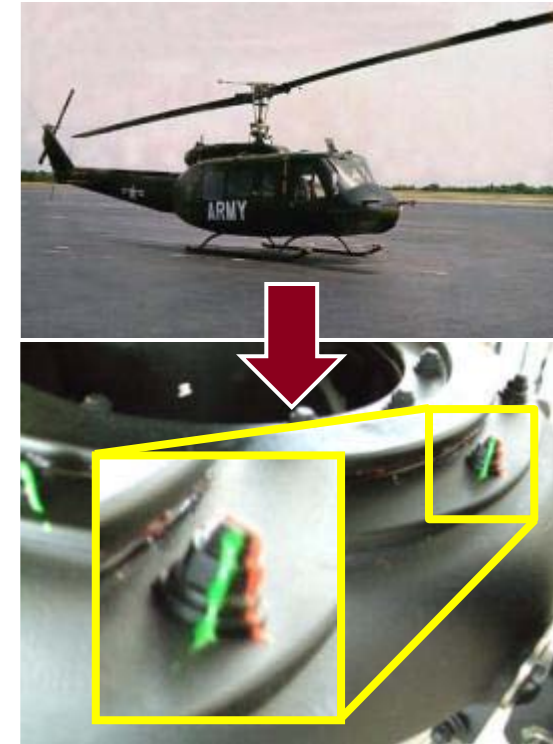
	Headquarters/PEO/PM	Installation/Field/User
Old Paradigm	<ul style="list-style-type: none"><li>■ <b><u>AUTHORIZE</u></b> cleaners to be used for each application</li><li>■ Require use of authorized cleaners in technical manuals, bulletins, drawings, etc.</li></ul>	<ul style="list-style-type: none"><li>■ Follow orders by using each cleaner as required</li><li>■ Be held <b><u>RESPONSIBLE</u></b> if required cleaner fails to comply with any/all regulations</li></ul>
	Headquarters/PEO/PM	Installation/Field/User
SPOTA Paradigm	<ul style="list-style-type: none"><li>■ <b><u>AUTHORIZE</u></b> HAP-free cleaners to be used for each application</li><li>■ Write new specification to encompass all authorized options</li><li>■ Reference new specification in technical manuals, bulletins, drawings, etc.</li><li>■ Take <b><u>RESPONSIBILITY</u></b> for preventing introduction of HAPs</li></ul>	<ul style="list-style-type: none"><li>■ Follow orders by referring to specification as required</li><li>■ <b><u>AUTHORIZE</u></b> local use of cleaners (from qualified product list) that are most appropriate to local conditions</li><li>■ Be held <b><u>RESPONSIBLE</u></b> if chosen cleaners fail to comply with local requirements/regulations</li></ul>



# Enacting Change Despite Limited Market Share



- Sealant used to detect vibration loosening
  - Baseline contains methanol/ethanol blend
  - SPOTA reformulation contains ethanol only
- Issue: Manufacturer implementation concerns
  - Dozens of DoD users at a handful of tubes per year
  - No economies of scale so production cost rises
  - Sales price rises so customer base shrinks
  - Why even bother?
- Solution: Army partnership with General Services Administration (GSA)
  - Establish new NSNs for each required color
  - Create economies of scale as single large user





# Take Home Message



SPOTA is helping installations comply with regulations...  
...but SPOTA is not a compliance program.

SPOTA is churning out great and varied products...  
...but SPOTA is not a collection of eaches.

SPOTA is filling capability gaps for the Warfighter...  
...but SPOTA is more than a technology program.

**SPOTA is sustainability in action.**



